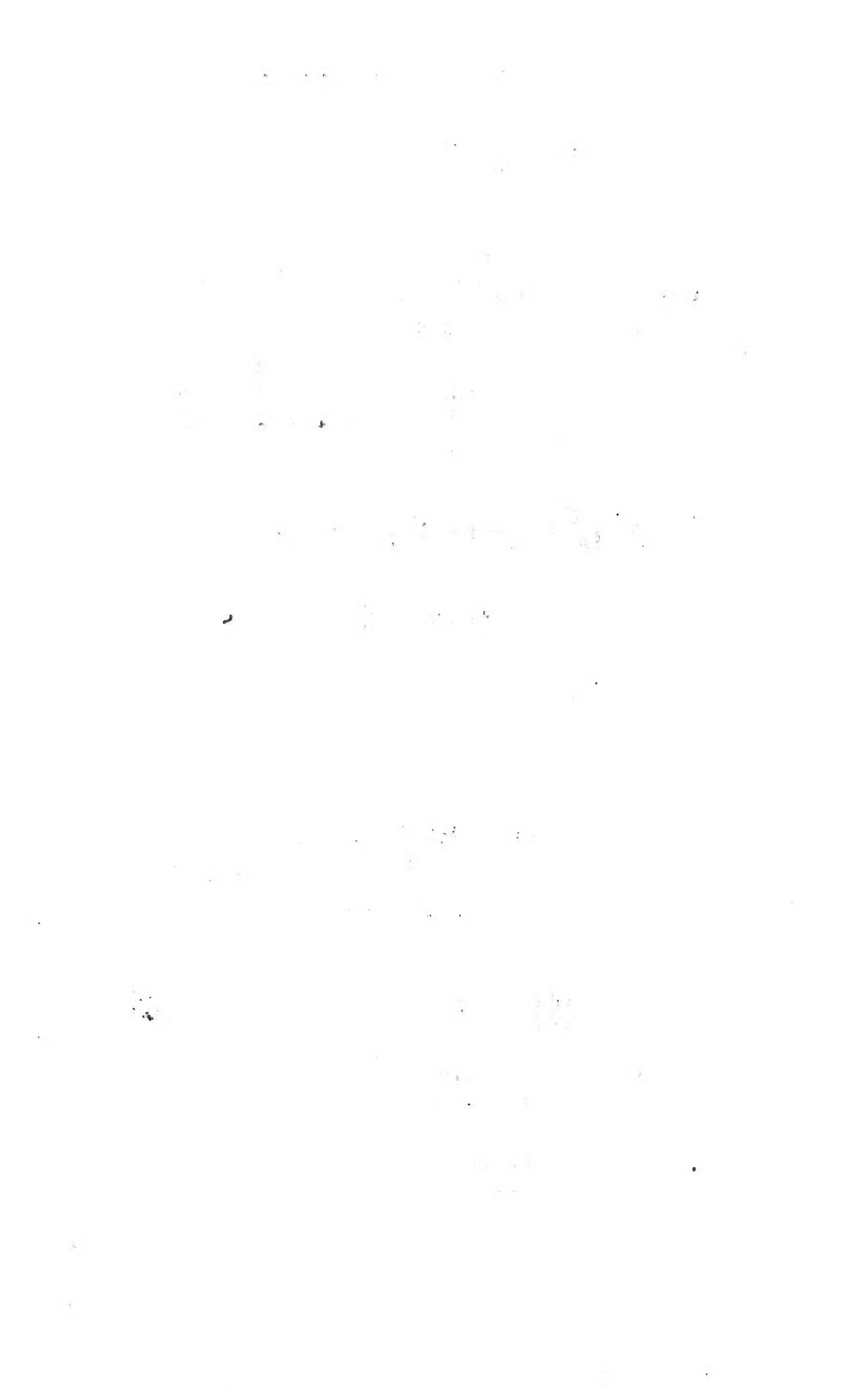


REPORT
ON
SEA AREA "A 153."
JOGGINS,
CUMBERLAND COUNTY,
Nova Scotia.

ALBERT J. HILL,
Member Canadian Society, Civil Engineers.

SYDNEY, C. B.:
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REPORT

ON

SEA AREA "A 153."

SIR,—I have the honor to acknowledge the receipt of your instructions to examine and report on your Coal Area 153, adjoining the properties of the Joggins Coal Mining Co., and Joggins Coal Mining Association in the County of Cumberland, and having carefully collated all available information on the subject with the experience gained during an extended management of the first named colliery, I beg leave to submit the following

REPORT:

Your property is known as "Sea Area A 153," and is described in the Mines Office as follows:

"Beginning at a squared post marked 1857, on the bank of the shore of Cumberland Basin—the beginning bound of the Joggins tract leased to the General Mining Association, thence by the course of their western line N. $16^{\circ} 30'$ E. 130 chains, thence N. $73^{\circ} 30'$ W. 120 chains, thence S. $16^{\circ} 30'$ W. to the shore, thence by the shore easterly and northerly to the place beginning."

With the exception of a small portion centrally and conveniently situated on the eastern boundary, the area is entirely marine, comprising three square miles on Cumberland Basin, though at low water a very considerable portion of it is exposed, and an opportunity is afforded of tracing the outcrop seawards for a long distance.

Except two small breaks, tall cliffs extend from Ragged Reef to a mile north of Cumberland Mine, exhibiting a fine exposure across the coal measures, and rising perpendicularly from

high water mark, in many places, to the height of two hundred feet.

The tides have an extreme vertical range of about seventy feet, exposing near the cliff a shingle and gravel beach graduating outwards into an almost level flat of stiff clay, of no great depth, but probably sufficient to form an impervious covering to the strata beneath.

Your claim covers portions of several workable seams of coal, ranging from seven to two feet in extreme thickness, two of which, the "Main" and Cumberland, have been extensively worked, and one at least—the Coal Mine Point seam proved to be capable of successful operation, while the "Five-foot" seam, eighteen feet above the Cumberland, and several minor seams underlying it, are known to contain large quantities of excellent fuel.

The accompanying comparative sections of the "Five-foot" seam exhibit its improvement westwards, and indicate that upon your area it may prove to be solid coal.

Your claim also contains large quantities of

IRON ORE (IRON STONE),

which, under skilful management, could no doubt be made a source of large revenue by smelting alone, or with the richer ores of Colchester or Annapolis, to which object every facility is offered by existing conveniences of rail and water transport.

From a number of analyses made of similar ores from the Nova Scotia Coal Measures, this may be regarded as containing about 33% of metallic iron.

I may also mention the black

BITUMINOUS LIMESTONES

which occur at several horizons on your property, and of which Sir William Dawson—an eminent authority—says: "This substance is the most valuable limestone in the country for application as a manure in consequence of the quantity of phosphate of lime contained in it in the form of scales and bones of fish. In consequence of its containing this valuable ingredient it is worth more than three times the price of ordinary limestone, and I have no doubt it will be extensively worked for agricultural purposes when the use of mineral manures becomes more general."

The winning of this valuable commodity will be referred to further on.

Lastly in this connection I may refer to the item of

FIRECLAY,

which, pending a scientific analysis and practical test, appears

to be of first rate quality and is absolutely inexhaustible in quantity. The unequalled facilities for manufacture and shipment make this, without exception, the finest locality in Nova Scotia for the establishment of brickyards and potteries, which gives a great prospective value to your property.

Having thus enumerated some of the lateral sources of revenue upon which you may confidently reckon, I will now, as succinctly as possible, lay before you the character of your claim, with regard to its great staple,

COAL,

and for this purpose will take the seams in the order of their apparent importance, and give, as far as possible, the known facts concerning each.

THE "MAIN SEAM"

has been worked continuously by the General Mining Association and Joggins Coal Mining Association for some sixty years. The system of working has been by slopes driven from the outcrop to the deep, the water being discharged by an adit to high water level at the cliff. The government has expended a considerable amount on the erection of an efficient pier and breakwater at which vessels of fifteen feet draught can load safely in all weathers, from March to December. This would be the natural shipping place of your sea-borne traffic, your several works being within easy reach by short lines of easily constructed tramway to be operated by endless ropes and gravity. Recently established railway connection with the Intercolonial also affords now direct access to the interior market, and establishes the practicability of continuous working as against the old time expensive winter idleness.

The Main Seam may be estimated as yielding five feet of clean coal of first-rate quality for steam purposes, and already well established in the New Brunswick and American markets. Its analysis is as follows:

Moisture and volatile matter.....	38.80
Fixed carbon.....	56.00
Ash.....	5.20
	100.00

Assuming the seam to be persistent, you have between the level indicated 1,240 feet below high water and the legal limit for cover, 676 acres of coal containing over five millions of tons. This alone represents a large output for many years. The coal from this seam has commanded from \$3.50 to \$4.00 per ton in

the market. Its cost to the Joggins Coal Mining Association delivered at St. John, N. B., may be stated approximately as follows:

Free on board at pier.....	\$1.00
Freight to St. John.....	66
Incidental charges.....	10
Max. cost.....	\$1.76
Min. return.....	3.50
Min. profit.....	\$1.74

In the prospectus of the Joggins Coal Mining Company 1874 I find the following: "Something may be judged as to what the paying qualities of the mine will be from the results of the seam now being worked by the Joggins Coal Mining Association, which paid its stockholders 8 per cent. during the past year besides placing 2 per cent. to rest account or contingent fund, thus earning 10 per cent. on its entire capital stock."

The above quotation is important in this connection as exhibiting the paying qualities of the Main Seam, even when worked on the comparatively small scale of 15,000 tons annually. I have every confidence that opened to the deep of the seam, as proposed, and operated on a large scale the advantages enjoyed of proximity to market and of unequalled transport facilities would, in still larger degree, prove it to be remunerative, especially in view of the prospect of improved trade conditions.

The seam has been tested by a borehole as indicated of upwards of 1,000 feet in depth, which establishes its persistency to the deep, and is sufficient evidence without further outlay to warrant the sinking of a shaft as proposed, from which the coal to the rise could be won as usual, and that to the deep by a slope drift as far as deemed practicable.

Should early returns be especially desirable, a slope drift from the outcrop might be driven to serve all present purposes, and as future upcast and pumping shaft, and to which the main working shaft would be sunk dry. Either method would command the western district of the adjoining area with obvious pecuniary advantage to your company.

At two hundred feet above the coal the shaft would intersect a bed of bituminous limestone—the most valuable in the field—to which reference has already been made, the extraction of which, for agricultural purposes, could proceed simultaneously with the colliery operations.

A few of the bands of limestone and ironstone have been placed in their proper positions on the section.

A tramway of half a mile in length over level ground will

convey the output from the proposed shaft to the pier and the Joggins railway gives immediate connection with the markets of the Intercolonial line east and west.

"CUMBERLAND SEAM."

This seam has been extensively worked, first by a drift from high water at the cliff, and subsequently by a slope 720 feet in length on the full dip of the seam, which, as in the case of all the measures in this vicinity, is at an angle of 19° or about 1 in 3.

The persistency of this seam is regarded as certain, and it may be estimated as containing a thickness of three feet of coal of exceptionally good quality as a domestic fuel—bright burning and of great heating power.

It may be effectively tapped by a shaft at a distance of $\frac{1}{4}$ mile north of the pier, and contains between 1,040 feet below high water and legal cover limit nearly two and one half millions of tons of coal upon your area.

By sinking as indicated your area may be reached by a level drift from which the rise coal can be won, and the deep by a diagonal drift or otherwise as may be deemed most expedient.

This shaft would intersect, besides, a heavy bed of bituminous limestone, the Coal Mine Point and Five Foot Seams before mentioned, which could all be economically operated from the same shaft, and as fast as intersected. In addition to the seven and a half millions of tons in the Main and Cumberland seams upon your area, a minimum estimate of two and one half millions of tons may fairly be given as available from the remaining seams, and as winning will be practicable below the levels of 1,240 and 1,040 feet respectively in the Main and Cumberland, a total estimate of twelve millions of tons of coal upon your area will not be an extravagant one. In this the persistency of the seams is assumed, which there appears to be no room to doubt, indeed experience goes to prove the rapid improvement of all the seams westward.

As in the case of the proposed shaft on the Main Seam, the command by this of a large district of coal on the adjoining area should be resolvable into great pecuniary advantage to your company in rental or royalty from the Joggins company, who would naturally avail themselves of this mode of access to the main body of their best coal.

MARKETS.

A railway is now in operation connecting the Joggins area with the Intercolonial railway at Macan station, throwing open the extensive and constantly extending market upon this splen-

did highway east and west. This not only places the Joggins field in successful competition with the other provincial mines for the supply of the government railways, but for their sea-borne trade secures the very important advantage of return freights from Portland and American ports generally for Northern Nova Scotia to which this short line becomes the natural inlet for a rapidly growing traffic. From official returns of 1886—the latest to which I at this moment have access. I observe that New Brunswick imported of Nova Scotia coal in that year 197,028 tons. Of this not more than 25,000 tons were drawn from the mines of West Cumberland—its natural point of supply. Without a labored argument, these figures alone show some of the possibilities and undeveloped opportunities of this field which requires only the enlightened use of a moderate capital to secure and hold this already respectable and rapidly expanding market. And when it is remembered that from their position the Cumberland Mines command the markets of 600 miles of seaboard from Cape Cod throughout the Bay of Fundy to Yarmouth, as well as the Island market reached by rail and river, the great discrepancy between supply and demand will be at once apparent and the opportunity that exists for the profitable investment of capital in this area will need no further elucidation.

The discrimination effected by difference of freights alone in favor of the introduction of Joggins coal to all the ports indicated amounts to a prohibitory tariff on the product of Eastern mines and of itself would constitute, exclusive of other decided advantages, a very fair profit on expenditure.

I have the honor to be, sir,

Your very obedient servant,

ALBERT J. HILL, M. A.,
M. Can. Soc. C. E.

JOSEPH A. GILLIES, Esq.

